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7. **BODY WEIGHT STUDIES**

There are several physiological factors needed to calculate potential exposures which include skin surface (see Volume I, Chapter 6), life expectancy (see Volume I, Chapter 8), and body weight. The average daily dose is based on the average body weight over the exposure period. If exposure occurs only during childhood years, the average child body weight during the exposure period should be used to estimate risk (U.S. EPA, 1989).

The purpose of this section is to describe published studies on body weight for the general U.S. population. The studies have been classified as either key or relevant studies. The classifications of these studies are based on the criteria described in Volume I, Section 1.3.1. Recommended values are based on the results of key studies, but relevant studies are also presented to provide the reader with added perspective on the current state of knowledge pertaining to body weight.

7.1. KEY BODY WEIGHT STUDY

NCHS - Anthropometric Reference Data and Prevalence of Overweight, United States, 1976-80 -Statistics on anthropometric measurements, including body weight, for the U.S. population were collected by the National Center for Health Statistics (NCHS) through the second National Health and Nutrition Examination Survey (NHANES II). NHANES II was conducted on a nationwide probability sample of approximately 28,000 persons, aged 6 months to 74 years, from the civilian, noninstitutionalized population of the United States. Of the 28,000 persons, 20,322 were interviewed and examined, resulting in a response rate of 73.1 percent. The survey began in February 1976 and was completed in February 1980. The sample was selected so that certain subgroups thought to be at high risk of malnutrition (persons with low incomes, preschool children, and the elderly) were oversampled. The estimates were weighted to reflect national population estimates. The weighting was accomplished by inflating examination results for each subject by the reciprocal of selection probabilities adjusted to account for those who were not examined, and post stratifying by race, age, and sex (NCHS, 1987).

The NHANES II collected standard body measurements of sample subjects, including height and weight, that were made at various times of the day and in different seasons of the year. This technique was used because one's weight may vary between winter and summer and may fluctuate with recency of food and water intake and other daily activities (NCHS, 1987). Mean body weights of adults, by age, and their standard deviations are presented in Table 7-1 for men, women, and both sexes combined. Mean body weights and standard deviations for children, ages 6 months to 19 years, are presented in Table 7-2 for boys, girls, and boys and girls combined. Percentile distributions of the body weights of adults by age and race for males are presented in Table 7-3, and for females in Table 7-4. Data for children by age are presented in Table 7-5 for males, and for females in Table 7-6.

	Table 7-1. I	Body Weigh	ts of Adults ^a	(kilograms)	
	Me	en	Wor	nen	Men and Women
Age (years)	Mean (kg)	Std. Dev.	Mean (kg)	Std. Dev.	Mean (kg)
18 < 25 25 < 35 35 < 45 45 < 55 55 < 65 65 < 75 18 < 75	73.8 78.7 80.9 80.9 78.8 74.8 78.1	12.7 13.7 13.4 13.6 12.8 12.8	60.6 64.2 67.1 68.0 67.9 66.6 65.4	11.9 15.0 15.2 15.3 14.7 13.8 14.6	67.2 71.5 74.0 74.5 73.4 70.7 71.8

Note: 1 kg = 2.2046 pounds.

Includes clothing weight, estimated as ranging from 0.09 to 0.28

kilogram.

Source: Adapted from National Center for Health Statistics (NCHS), 1987.

	Во	ys	Gir	·ls	Boys and Girls
Age	Mean (kg)	Std. Dev.	Mean (kg)	Std. Dev.	Mean (kg)
6-11 months	9.4	1.3	8.8	1.2	9.1
1 year	11.8	1.9	10.8	1.4	11.3
2 years	13.6	1.7	13.0	1.5	13.3
3 years	15.7	2.0	14.9	2.1	15.3
4 years	17.8	2.5	17.0	2.4	17.4
5 years	19.8	3.0	19.6	3.3	19.7
6 years	23.0	4.0	22.1	4.0	22.6
7 years	25.1	3.9	24.7	5.0	24.9
8 years	28.2	6.2	27.9	5.7	28.1
9 years	31.1	6.3	31.9	8.4	31.5
10 years	36.4	7.7	36.1	8.0	36.3
11 years	40.3	10.1	41.8	10.9	41.1
12 years	44.2	10.1	46.4	10.1	45.3
13 years	49.9	12.3	50.9	11.8	50.4
14 years	57.1	11.0	54.8	11.1	56.0
15 years	61.0	11.0	55.1	9.8	58.1
16 years	67.1	12.4	58.l	10.1	62.6
17 years	66.7	11.5	59.6	11.4	63.2
18 years	71.1	12.7	59.0	11.1	65.1
19 years	71.7	11.6	60.2	11.0	66.0

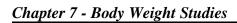
Note: 1 kg = 2.2046 pounds.

Includes clothing weight, estimated as ranging from 0.09 to 0.28 kilogram.

Source: Adapted from National Center for Health Statistics (NCHS),



102.7 99.5 102.7 104.3 105.3 96.6 102.3 100.0 102.7 104.1 104.5 101.7 96.0 105.4 93.6 106.3 104.7 95th
 Table 7-3. Weight in Kilograms for Males 18-74 Years of Age--Number Examined, Mean, Standard
 95.5 91.0 95.3 98.7 99.0 94.5 98.3 83.7 92.2 104.2 102.5 98.6 95.7 90.4 95.1 98.8 99.5 94.7 90th Deviation, and Selected Percentiles, by Race and Age: United States, 1976-1980 92.9 81.8 90.6 100.4 100.0 93.8 90.8 91.3 85.1 91.1 94.8 90.5 91.4 85.5 91.3 94.6 94.2 90.4 87.9 85th 85.6 80.3 85.6 88.1 89.4 85.6 85.6 80.6 85.6 88.2 89.4 85.6 85.4 77.1 84.4 94.8 93.0 86.5 75th 50th76.9 72.0 77.5 79.9 79.0 77.7 77.3 72.4 78.0 80.1 79.0 74.7 75.3 70.8 75.3 83.1 81.8 77.0 68.7 64.8 69.3 72.1 71.7 70.2 66.1 69.4 65.0 69.8 72.9 71.9 70.6 67.2 64.9 68.4 69.7 73.2 68.0 25th 65.5 62.0 65.9 68.8 67.3 66.6 63.6 62.3 64.9 65.2 67.0 64.3 15th 64.9 61.9 65.4 67.7 67.2 66.4 ^a Includes clothing weight, estimated as ranging from 0.09 to 0.28 kilogram. ^b Includes all other races not shown as separate categories. 10th 62.3 60.4 62.9 65.1 65.2 63.8 58.5 62.8 60.5 63.7 66.6 66.1 64.5 59.5 61.1 60.9 63.4 61.7 64.7 61.4 56.7 58.6 56.8 59.7 59.7 50.8 59.9 59.3 56.8 59.9 62.0 62.0 55.5 58.0 58.3 *c * 56.8 52.5 5th Deviation Standard Source: National Center for Health Statistics, 1987 13.5 12.7 13.7 13.4 13.6 12.8 15.2 12.0 16.3 15.4 14.5 14.7 13.1 12.8 13.1 12.8 13.4 12.4 12.4 Mean 78.1 73.8 78.7 80.9 80.9 78.8 77.9 72.2 78.2 82.5 82.4 73.3 78.5 74.2 79.0 81.4 81.0 78.9 (kg) Number of Examined Persons Note: 1 kg = 2.2046 pounds. 5,916 988 1,067 745 690 1,227 1,199 5,148 846 901 653 617 ,086 649 121 139 70 62 62 129 128 Data not available. 18-74 years 18-24 years 25-34 years 35-44 years 55-64 years 18-74 years 18-24 years 25-34 years 35-44 years 45-54 years 55-64 years All races^b
18-74 years
18-24 years
25-34 years
35-44 years
55-64 years
55-64 years
65-74 years Race and Age





			Deviation, and Selected Percentiles, by Race and Age: United States, 1976-1980	ınd Selecte									
Race and Age	Number of Persons Examined	Mean (kg)	Standard Deviation	 n 5th	l	15th	25th	50th	Percentile 75th	ile 85th	90th	95th	
All races ^b		(G.,)											
18-74 years	6,588	65.4	14.6	47.7	50.3	52.2	55.4	62.4	72.1	79.2	84.4	93.1	
18-24 years	1,066	9.09	11.9	46.6	49.1	50.6	53.2	58.0	65.0	70.4	75.3	82.9	
25-34 years	1,170	64.2	15.0	47.4	49.6	51.4	54.3	6.09	9.69	78.4	84.1	93.5	
35-44 years	844	67.1	15.2	49.2	52.0	53.3	56.9	63.4	73.9	81.7	87.5	98.9	
40-04 years	703 1 399	0.80	15.5	48.5 48.6	51.3	55.5 54.1	57.3	65.2 65.2	75.3	82.1 89.3	87.5 87.5	96.0 95.1	
65-74 years	1,416	9.99	13.8	47.1	50.8	53.2	57.4	64.8	73.8	79.8	84.4	91.3	
White													
18-74 years	5,686	64.8	14.1	47.7	50.3	52.2	55.2	62.1	71.1	77.9	83.3	91.5	
18-24 years	892	60.4	11.6	47.3	49.5	50.8	53.3	57.9	64.8	69.7	74.3	82.4	
25-34 years	1,000	63.6	14.5	47.3	49.5	51.3	54.0	9.09	68.9	76.3	81.5	89.7	
35-44 years	726	66.1	14.5	49.3	51.8	52.9	56.3	62.4	71.9	79.7	82.8	94.9	
45-54 years	647	67.3	14.4	48.6	51.3	53.4	57.0	65.0	74.8	81.1	85.6	94.5	
55-64 years	1,176	67.2	14.4	48.5	50.7	53.7	57.1	64.7	74.5	81.8	86.2	92.8	
65-74 years	1,245	66.2	13.7	47.2	50.7	52.9	57.2	64.3	72.9	79.2	84.3	91.2	
Black													
18-74 years	782	71.2	17.3	48.8	51.6	55.1	59.1	8.79	9.08	87.4	94.9	105.1	
18-24 years	147	63.1	13.9	46.2	49.0	50.6	53.8	60.4	70.0	75.8	79.1	89.3	
25-34 years	145	69.3	16.7	48.3	20.8	53.1	27.8	65.3	80.2	87.1	91.5	102.7	
35-44 years	$\frac{103}{100}$	75.3	18.4	50.7	55.2	57.2	63.0	70.2	85.2	95.3	103.5	113.1	
45-54 years	100	77.7	18.8	55.1	60.3	60.8	64.5	74.3	83.6	94.5	98.2	117.5	
55 74 years	155	72.4	10.4 13.6	52.9	56.4 56.4	0.7c 60.3	64.0	70.0	83.4	91.9 84 4	95.5 86.5	108.5 98.1	
Note: 1 kg = 2.2046 pounds. ^a Includes clothing weight, estimated as ranging from 0.09 to 0.28 kilogram. ^b Includes all other races not shown as separate categories.	46 pounds. weight, estima	ated as ra	nging fron	n 0.09 to	0.28 kilog	gram.							
Source: National Contor for Haalth Statistics 1987	ontor for Hos	Jth Ctatic	tics 1087										
Source: Mandana			. 1001.										

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11.4 14.4 16.5 19.1 22.2 25.4 30.1 33.9 33.0 33.1 33.9 33.1 53.4 61.0 67.5 69.9 77.0 77.0 88.9 995.3 95th Table 7-5. Weight in Kilograms for Males 6 Months-19 Years of Age--Number Examined, Mean, Standard Deviation, and Selected Percentiles, by Sex and Age: United States, 1976-1980 110.9 113.6 20.9 20.9 22.3.7 22.3.7 22.9 23.7 23.7 25.0 35.5 57.0 64.2 64.2 68.9 68.9 88.3 88.3 88.3 88.3 90th 85th Percentile 75th 50th 8.6 10.8 12.6 14.4 14.4 16.0 17.7 22.2 22.2 22.2 27.1 31.4 33.5 37.8 40.8 54.2 57.8.7 61.9 25th 15th Note: 1 kg = 2.2046 pounds. Includes clothing weight, estimated as ranging from 0.09 to 0.28 kilogram. 10th 5th Deviation Standard 1.3 1.9 1.7 1.7 2.0 2.5 3.0 3.0 6.2 6.3 7.7 7.7 11.0 11.0 11.0 11.0 11.5 11.6 Source: National Center for Health Statistics, 1987. Mean (kg) 9.4 111.8 113.6 115.7 117.8 119.8 223.0 225.1 228.2 23.0 225.1 31.1 36.4 440.3 36.4 440.3 57.1 61.0 66.7 71.7 Number of Persons Examined

 10 years

 11 years

 12 years

 13 years

 14 years

 15 years

 16 years

 17 years

 18 years

 19 years

 6-11 Months 2 years
3 years
4 years
5 years
6 years
7 years
8 years 1 years

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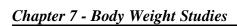




	Table 7-6.	•	eight in Kilograms for Females 6 Months-19 Years of AgeNumber Examined, I Deviation, and Selected Percentiles, by Sex and Age: United States, 1976-1980	grams for ind Selecte	Females 6 d Percenti	Months-	19 Years x and Ag	of Age	Number E	Weight in Kilograms for Females 6 Months-19 Years of AgeNumber Examined, Mean, Standard Deviation, and Selected Percentiles, by Sex and Age: United States, 1976-1980	Aean, Stanc	lard	
				Percentile									
Age	Number of Persons Examined	Mean (kg)	Standard Deviation	n 5th	10th	15th	25th	50th	75th	85th	90th	95th	
6-11 Months	177	8.8	1.2	9.9	7.3	7.5	7.9	8.9	9.4	10.1	10.4	10.9	
1 years	336	10.8	1.4	8.8	9.1	9.4	6.6	10.7	11.7	12.4	12.7	13.4	
2 years	336	13.0	1.5	10.8	11.2	11.6	12.0	12.7	13.8	14.5	14.9	15.9	
3 years	366	14.9	2.1	11.7	12.3	12.9	13.4	14.7	16.1	17.0	17.4	18.4	
4 years	396	17.0	2.4	13.7	14.3	14.5	15.2	16.7	18.4	19.3	20.2	21.1	
5 years	364 126	19.0 99.1	8.5 5.0	15.3	10.1	10.7 10.6	10.2	19.0	21.7	8.22 96	24.7	20.6 30.6	
o years	153	24.7	5.0	19.2	19.5	0.01	19.3 21.4	23.8	27.1	28.7	30.3	34.0	
8 years	123	27.9	5.7	21.4	22.3	23.3	24.4	27.5	30.2	31.3	33.2	36.5	
9 years	149	31.9	8.4	22.9	25.0	25.8	27.0	29.7	33.6	39.3	43.3	48.4	
10 years	136	36.1	8.0	25.7	27.5	29.0	31.0	34.5	39.5	44.2	45.8	49.6	
11 years	140	41.8	10.9	8.62	30.3	31.3	33.9	40.3	45.8	51.0	26.6	0.09	
12 years	147	46.4	10.1	32.3	35.0	36.7	39.1	45.4	52.6	28.0	60.5	64.3	
13 years	162	50.9	11.8	35.4	39.0	40.3	44.1	49.0	55.2	60.09	66.4	76.3	
14 years	178	54.8	11.1	40.3	42.8	43.7	47.4	53.1	60.3	65.7	9.79	75.2	
15 years	145	55.1	8.6	44.0	45.1	46.5	48.2	53.3	59.6	62.2	65.5	9.92	
16 years	170	58.1	10.1	44.1	47.3	48.9	51.3	55.6	62.5	68.9	73.3	76.8	
17 years	134	59.6	11.4	44.5	48.9	50.5	52.2	58.4	63.4	68.4	71.6	81.8	
18 years 19 years	170 158	59.0 60.2	11.1	45.3 48.5	49.5 49.7	50.8 51.7	52.8 53.9	50.4 57.1	63.0 64.4	70.7	74.8	78.0 78.1	
Note: 1 kg = 2.2046 pounds.	046 pounds.												
" Includes clothing	g weight, estin		as ranging from 0.09 to 0.28 kilogram.	n 0.09 to	0.28 kilc	gram.							
Source: National Center for Health Si	Center for Hea	ılth Statisı	tatistics, 1987.										

Chapter 7 - Body Weight Studies

Results shown in Tables 7-3 and 7-4 indicate that the mean weight for adult males is 78.1 kg and for adult females, 65.4 kg. It also shows that the mean weight for White males (78.5 kg) is greater than for Black males (77.9 kg). Additionally, mean weights are greater for Black females (71.2 kg) than for White females (64.8 kg). From Table 7-2, the mean body weights for girls and boys are approximately the same from ages 6 months to 14 years. Starting at years 15-19, the difference in mean body weight ranges from 6 to 11 kg.

7.2. RELEVANT BODY WEIGHT STUDIES

Burmaster et al. (Submitted 2/19/94 to Risk Analysis for Publication) - Lognormal Distributions of Body Weight as a Function of Age for Female and Male Children in the United States - Burmaster et al. (1994), performed data analysis to fit normal and lognormal distributions to the body weights of female and male children at age 6 months to 20 years (Burmaster et al., 1994).

Data used in this analysis were from the second survey of the National Center for Health Statistics, NHANES II, which included responses from 4,079 females and 4,379 males 6 months to 20 years of age in the U.S. (Burmaster et al., 1994). The NHANES II data had been statistically adjusted for non-response and probability of selection, and stratified by age, sex, and race to reflect the entire U.S. population prior to reporting (Burmaster et al., 1994). Burmaster et al. (1994) conducted exploratory and quantitative data analyses, and fit normal and lognormal distributions to percentiles of body weight for children. Cumulative distribution functions (CDFs) were plotted for female and male body weights on both linear and logarithmic scales.

Two models were used to assess the probability density functions (PDFs) of children's body weight. Linear and quadratic regression lines were fitted to the data. A number of goodness-of-fit measures were conducted on data generated by the two models. Burmaster et al. (1994) found that lognormal distributions give strong fits to the body weights of children, ages 6 months to 20 years. Statistics for the lognormal probability plots are presented in Tables 7-7 and 7-8. These data can be used for further analyses of body weight distribution (i.e., application of Monte Carlo analysis).

Brainard and Burmaster - Bivariate Distributions for Height and Weight of Men and Women in the United States - Brainard and Burmaster (1992) examined data on the height and weight of adults published by the U.S. Public

Table 7-7. Statistics for Probability Plot Regression Analyses Female's Body Weights 6 Months to 20 Years of Age					
Age	Lognormal Probabilit Linear Curve	y Plots			
	$\mu_2^{\ a}$	$\sigma_{\!\scriptscriptstyle 2}^{\;\scriptscriptstyle a}$			
6 months to 1 year	2.16	0.145			
1 to 2 years	2.38	0.128			
2 to 3 years	2.56	0.112			
3 to 4 years	2.69	0.137			
4 to 5 years	2.83	0.133			
5 to 6 years	2.98	0.163			
6 to 7 years	3.10	0.174			
7 to 8 years	3.19	0.174			
8 to 9 years	3.31	0.156			
9 to 10 years	3.46	0.214			
10 to 11 years	3.57	0.199			
11 to 12 years	3.71	0.226			
12 to 13 years	3.82	0.213			
13 to 14 years	3.92	0.216			
14 to 15 years	3.99	0.187			
15 to 16 years	4.00	0.156			
16 to 17 years	4.06	0.167			
17 to 18 years	4.08	0.165			
18 to 19 years	4.07	0.147			
19 to 20 years	4.10	0.149			

^a μ₂, σ₂ - correspond to the mean and standard deviation, respectively, of the lognormal distribution of body weight (kg).
Source: Burmaster et al., 1994.

Table 7-8. Statistics for Probability Plot Regression Analyses Male's Body Weights 6 Months to 20 Years of Age					
Age	Lognormal Probability Plo Linear Curve	ts			
	${\mu_2}^{\rm a}$	$\sigma_2^{\ a}$			
6 months to 1 year	2.23	0.132			
1 to 2 years	2.46	0.119			
2 to 3 years	2.60	0.120			
3 to 4 years	2.75	0.114			
4 to 5 years	2.87	0.133			
5 to 6 years	2.99	0.138			
6 to 7 years	3.13	0.145			
7 to 8 years	3.21	0.151			
8 to 9 years	3.33	0.181			
9 to 10 years	3.43	0.165			
10 to 11 years	3.59	0.195			
11 to 12 years	3.69	0.252			

12 to 13 years

13 to 14 years

14 to 15 years

15 to 16 years

16 to 17 years

17 to 18 years

18 to 19 years

19 to 20 years

3.78

3.88

4.02

4.09

4.20

4.19

4.25

4.26

0.224

0.215

0.181

0.159

0.168

0.167

0.159

0.154

^a μ₂, σ₂ - correspond to the mean and standard deviation, respectively, of the lognormal distribution of body weight (kg). Source: Burmaster et al., 1994.

Chapter 7 - Body Weight Studies



Health Service and fit bivariate distributions to the tabulated values for men and women, separately.

Height and weight of 5,916 men and 6,588 women in the age range of 18 to 74 years were taken from the NHANES II Study and statistically adjusted to represent the U.S. population aged 18 to 74 years with regard to age structure, sex, and race. Estimation techniques were used to fit normal distributions to the cumulative marginal data and goodness-of-fit tests were used to test the hypothesis that height and lognormal weight follow a normal distribution for each sex. It was found that the marginal distributions, of height and lognormal weight for both men and women, are Gaussian (normal) in form. conclusion was reached by visual observation and the high R² values for best-fit lines obtained using linear regression. The R² values for men's height and lognormal weight are reported to be 0.999. The R² values for women's height and lognormal weight are 0.999 and 0.985, respectively.

Brainard and Burmaster (1992) fit bivariate distributions to estimated numbers of men and women aged 18 to 74 years in cells representing 1 inch height intervals and 10 pound weight intervals. Adjusted height and lognormal weight data for men were fit to a single bivariate normal distribution with an estimated mean height of 1.75 meters (69.2 inches) and an estimated mean weight of 78.6 kg (173.2 pounds). For women, height and lognormal weight data were fit to a pair of superimposed bivariate normal distributions (Brainard and Burmaster, 1992). The average height and weight for women were estimated from the combined bivariate analyses. Mean height for women was estimated to be 1.62 meters (63.8 inches) and mean weight was estimated to be 65.8 kg (145.0 pounds). For women, a calculation using a single bivarite normal distribution gave poor results (Brainard and Burmaster, According to Brainard and Burmaster, the distributions are suitable for use in Monte Carlo simulation.

AIHC - Exposure Factors Sourcebook - The Exposure Factors Sourcebook (AIHC, 1994) provides similar body weight data as presented here. Consistent with this document, an average adult body weight of 72 kg is recommended on the basis of the NHANES II data (NCHS, 1987). These data are also used to derive probability distributions for adults and children. In addition, the Sourcebook presents probability distributions derived by Brainard and Burmaster (1992), Versar (1991) and Brorby and Finley (1993). For each distribution, the @Risk formula is provided for direct use in the @Risk simulation software (Palisade, 1992). The organization of this document, makes it very convenient to use in support of Monte Carlo analysis. The reviews of the supporting

studies are very brief with little analysis of their strengths and weaknesses. The Sourcebook has been classified as a relevant rather than key study because it is not the primary source for the data used to make recommendations in this document. The Sourcebook is very similar to this document in the sense that it summarizes exposure factor data and recommends values. As such, it is clearly relevant as an alternative information source on body weights as well as other exposure factors.

7.3. RECOMMENDATIONS

The key study described in this section was used in selecting recommended values for body weight. The general description of both the key and relevant studies are summarized in Table 7-9. The recommendations for body weight are summarized in Table 7-10. Table 7-11 presents the confidence ratings for body weight recommendations. The mean body weight for all adults (male and female, all age groups) combined is 71.8 kg as shown in Table 7-1. The mean values for each age group in Table 7-1 were derived by adding the body weights for men and women and dividing by 2. If age and sex distribution of the exposed population is known, the mean body weight values in Table 7-1 can be used. If percentile data are needed or if race is a factor, Tables 7-3 and 7-4 can be used to select the appropriate data for percentiles or mean values. For children, appropriate mean values for weights may be selected from Table 7-2. If percentile values are needed, these data are presented in Table 7-5 for male children and in Table 7-6 for female children. This recommended value is different than the 70 kg commonly assumed in EPA risk assessments. Assessors are encouraged to use values which most accurately reflect the exposed population. When using values other than 70 kg, however, the assessors should consider if the dose estimate will be used to estimate risk by combining with a dose-response relationship which was derived assuming a body weight of 70 kg. If such an inconsistency exists, the assessor should adjust the doseresponse relationship as described in the appendix to Chapter 1. The Integrated Risk Information System (IRIS) does not use a 70 kg body weight assumption in the derivation of RfCs and RfDs, but does make this assumption in the derivation of cancer slope factors and unit risks.

7.4. REFERENCES FOR CHAPTER 7

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	Table 7-9.	Summary of Body	Weight Studies
Study	Number of Subjects	Population	Comments
KEY STUDY			
NCHS, 1987 (NHANES II)	20,322	U.S. general population	Based on civilian non-institutionalized population aged 6 months to 74 years. Response was 73.1 percent.
RELEVANT STUDIES			
Brainard and Burmaster, 1992	12,501 (5,916 men and 6,588 women)	U.S. general population	Used data from NHANES II to fit bivarite distributions to women and men age 18 to 74 years.
Burmaster et al., 1994	8,458 (4,079 females and 4,379 males)	U.S. general population	Used data from NHANES II to develop fitted distributions fo children aged 6 to 20 years old. Adjusted for non-response by age, gender, and race.

	Table 7-10. Summary of	Recommended Values for Body Weight	
Population	Mean	Upper Percentile	Multiple Percentiles
Adults	71.8 kg (See Table 7-1)	See Tables 7-3 and 7-4	See Tables 7-3 and 7-4
Children	See Table 7-2	See Tables 7-5 and 7-6	See Tables 7-5 and 7-6

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Considerations	Rationale	Rating
Study Elements		
• Level of peer review	NHANES II was the source of data for this study. This is a published study which received a high level of peer review.	High
• Accessibility	The study is widely available to the public.	High
Reproducibility	Results can be reproduced by analyzing NHANES II data.	High
• Focus on factor of interest	The study focused on body weight, the exposure factor of interest.	High
Data pertinent to US	Data represents the U.S. population.	High
Primary data	The primary data was generated from the NHANES II study, thus this data is secondary.	Medium
• Currency	The study was published in 1987.	Medium
Adequacy of data collection period	The study included data collected from 1976 to 1980. Body weight measurements were taken at various times of the day and at different seasons of the year.	High
Validity of approach	Direct body weight were measured. Subgroups at risk for malnutrition were over-sampled. Weighting was accomplished by inflating examination results for those not examined and were stratified by race, age, and sex.	High
• Study size	The sample size consisted of 28,000 persons.	High
• Representativeness of the population	Data collected focused on the U.S. population.	High
Characterization of variability	The study characterized variability regarding age, sex and race (for Blacks, Whites and total populations). The study also sampled persons with low income.	High
• Lack of bias in study design (high rating is desirable)	There are no apparent biases in the study design.	High
Measurement error	Measurement error should be low since body weights were performed in a mobile examination center using standardized procedures and equipment. Also, measurements were taken at various times of the day to account for weight fluctuations as a result of recent food or water intake.	High
Other Elements		
• Number of studies	One	Low
Agreement between researchers	The agreement is 100% since the recommendation is based on one key study.	High
Overall Rating		High